

21 July 1965

Dear Paul,

The enclosed reports cover the period from April 13th to July 13th, 1965. This completes the first year's efforts on the Direct Image Viewer.

Sincerely,

STATOTHR

  
Project Engineer

Encls. (5)

Declass Review by NIMA/DOD

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DIRECT IMAGE VIEWER  
Fourth Quarterly Report  
4/13/65 to 7/13/65  
Project 7506  
[REDACTED]

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STATOTHR  
[REDACTED]

I. PROGRESS SUMMARY

- A. Customer review and acceptance was held on May 24, 1965.

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- B. Review of [REDACTED] efforts and testing of second trial grating was held on May 25, 1965.

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- C. Second set of optics received from [REDACTED] except for field lens which was damaged before shipment and is undergoing rework.

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- D. [REDACTED] has been given the go-ahead for Phase III. The 10 x 10 replicas are scheduled for delivery by the end of September.
- E. The Instruction Manual has been written and is undergoing publication.
- F. All of the viewer modifications requested have been completed.

II. ADMINISTRATIVE DETAILS

A. Schedule

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Unless we receive a grating from the customer, the expected delivery date for the viewer with the [REDACTED] gratings will be the early part of October.

The second set of optics will also be available at this time.

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B. [REDACTED] Phase III Efforts

The official start date for [REDACTED] authorized by a TWX from [REDACTED] was June 21, 1965. Since this is a three-month program, we expect to install the grating at the end of September.

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### III. TECHNICAL DISCUSSION

#### A. Progress

##### 1. Optics

The first complete set of optics was delivered during the early part of May and installed for the customer tests of May 24th and 25th.

During the month of June, the condensers were returned for re-coating of the 45° reflectors. The new coatings were to have a higher transmission efficiency in the green portion of the spectrum.

STATOTHR The second set of optics, except for the large field  
STATOTHR lens, has been delivered to [REDACTED] During final clean-  
ing at [REDACTED] one of the elements was broken.  
An additional two months will be required for fabrication of  
a new element. This lens should be delivered to [REDACTED] before  
the viewer is delivered with the [REDACTED] gratings.

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##### 2. Diffraction Grating

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ings. Discussions were held with [REDACTED]  
[REDACTED] and the customer on the problems that could be encountered  
in fabrication of the 10 x 10 master. A detailed report of  
that discussion was submitted. [REDACTED] was not given the  
go-ahead at the time of the meeting. After due consideration  
on the part of the customer, a decision was made to begin  
Phase III, the fabrication of the 10 x 10 master.

Illumination distribution tests were conducted on the  
2 x 2 second trial grating. The results are listed as follows:

a. The greatest difference between any two adjacent overlapped exit pupils (.142 x .142 inch) was 1.75:1.

b. The maximum difference between any two areas was 3.7:1. This was obtained between an area near the central order and a corner where the 9th and 10th orders in the x and y direction overlap.

The above values were better than the required 2:1 and 4:1 specified as design goals. It just happens that the 9th and 10th order lines on both sides fall close to the normal eye spacing distance apart. Therefore, a small amount of lateral head movement will cause one eye or the other to cross this less intense exit pupil band. If this same intensity loss appeared at other orders, such as third and fourth, a greater head movement would be possible before crossing over the darker band with an eye.

### 3. Viewer

Customer evaluation of the viewer took place on May 24, 1965. A detailed report was submitted following the evaluation meeting. The viewer was accepted with a few minor changes required. These have been taken care of and the viewer is ready for delivery pending receipt, installation, and testing with a full size grating. The enclosed picture is a retouched photograph of the viewer showing what the handles and trim strip will look like.

The manual has been written and is being published at this time. It will be delivered with the viewer, but will be available for delivery in August, if requested.

The Engineering Report is complete except for test results yet to be produced upon arrival of the 10 x 10 grating. Therefore, the final publication of the report will follow the delivery of the viewer within 30 days.

B. Trips

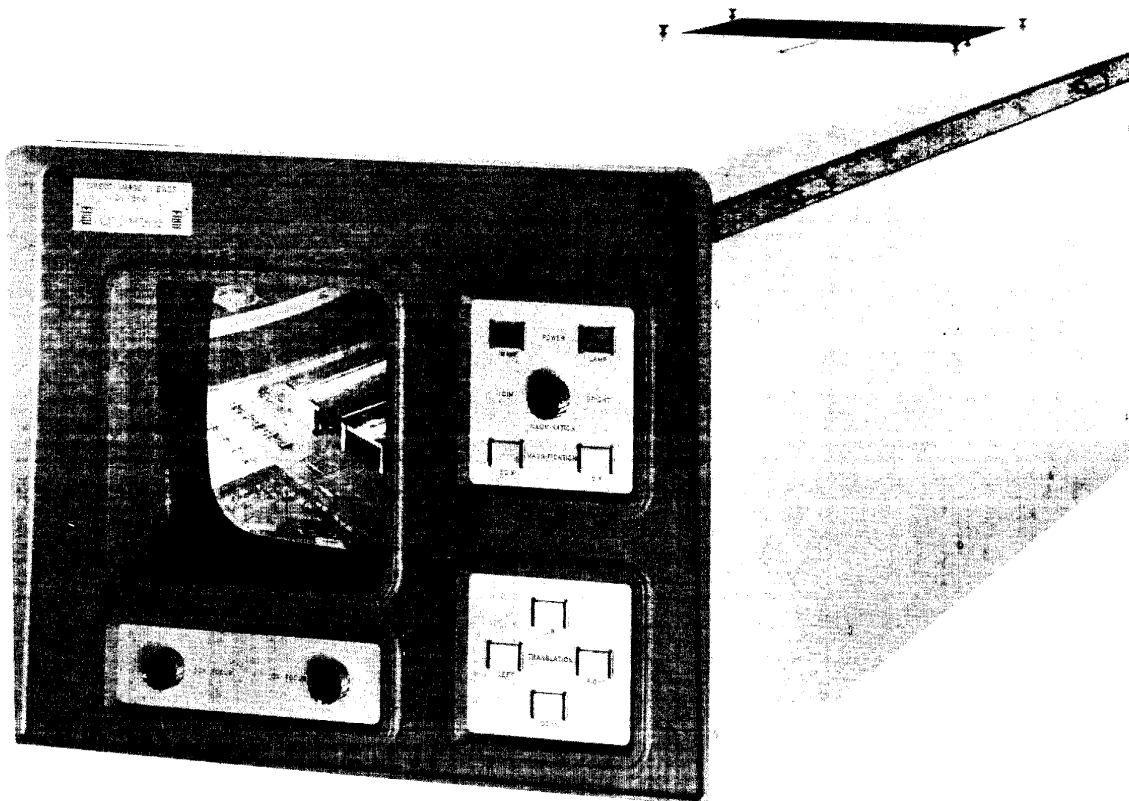
No trips were made during this reporting period.

C. Work Planned for Next Period

- Publish the viewer manual.
- Receive the field lens under repair, thereby completing  
the second set of optics. STATOTHR
- Receive the 10 x 10 replica gratings from [REDACTED]
- Install the 10 x 10 gratings and run the final acceptance test and acquire final data for report.
- Ship viewer to customer.
- Complete and publish Engineering Report.



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